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The Cultivated Aconites

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252. ACONITUM VULPARIA. Upper left, flowering branch and leaf; center, follicles and details of flower (helmet above the figure 1, lateral sepal to the right, somewhat unequal lower sepals beneath, short stamen and elongate petal lower left). ACONITUM PYRENAICUM, lower right, leaf, flower and follicles.

L. H. Bailey
12-45

ARTICLE 12.
THE CULTIVATED ACONITES.

Because of their beauty of flower and foliage the aconites well deserve the attention of gardeners and flower-lovers. Several different species are rather widely grown, ranging in color from deep purple through violet, purple and white, to white and yellow. In form they run from low plants with finely dissected leaves to stalwart clumps of compact or more open habit, with dark glossy coarse leaves. Some species are tall, some even vine-like.

For some years at the Bailey Hortorium considerable attention has been given to growing the aconites offered in the trade. These have been photographed and herbarium specimens made as a permanent record. The names most frequently used for cultivated plants are *autumnale*, *californicum*, *Fischeri*, *Napellus*, *Napellus bicolor*, Sparks variety, and *Wilsonii*. Many other names are met with occasionally. By virtue of the accumulations from several years of attention to these garden plants, and because of the obvious confusion in names, this study has been undertaken with the hope that the horticulturist may find the correct name for his garden plant and that the botanist may identify the more common wild species.

The genus Aconitum is botanically a very large group, for which some five hundred species have been proposed. Many of these are recognized by certain students largely as separate species and by others as subspecies and varieties and forms. The greatest center of development is in the mountains of eastern Asia, the next in those of central Europe, and a smaller group in western North America. It is thus seen to be a northern genus reaching its southernmost extension in north Africa and northern Mexico.

Interest in the aconites (monkshoods, wolfbanes) goes back a long way, probably originating in their poisonous properties. In fact, the Greek name "akoniton" was employed by Dioscorides for a plant used to poison "wolves and panthers." According to Stapf (Ann. Roy. Bot. Gard. Calcutta, x, 115, 1905) aconites have occupied an important place in the Indian Pharmacopœia from very remote times and these Indian aconites were incorporated by the Arabs into their works about the eighth century. In India wide use was made in poisoning arrows. In northern Europe during the Middle Ages studies were made on the use of the poison in the tubers for medicinal purposes, *A. Napellus* being cultivated in the sixteenth century (Gartenflora, lxxxv, 86, 1936). Even now wild and cultivated plants

are gathered for the drug, a very powerful alkaloid *aconitin*, which is most concentrated in the tubers.

The beauty of the flowers of the aconites has led to their other chief use, cultivated species being European, Asiatic and American. Being hardy, having showy flowers and good foliage, and in most cases forming effective clumps of some height, they lend themselves to borders, especially where one wishes contrast with yellow, white and other colors. Some species like *A. Vulparia* and *A. Anthora* bloom in early summer, others like *A. Henryi* in late summer, and *A. Carmichaelii* in the autumn.

They do well in good garden soil and in full sun, but the flowers last better in partial shade. Propagation is by seeds or by division of the roots. In the former case, seeds should be planted soon after harvesting and germinate slowly; spring-sown seeds are said to lie dormant a year. Best success with seeds seems to come from planting in flats or pots and keeping in a cool house the first winter, or even sinking in the ground. Then the seedlings can be transplanted when about two inches high.

The roots are of two general types: (1) a perennial system with elongate thickened branches, as in the Lycoctonum group (Fig. 253), or (2) a turnip- to carrot-shaped tuber which is renewed each year on the end of a slender subterranean branch from the old tuber as in *A. Anthora* and *A. Napellus* (see Figs. 259 and 268). Either kind of root can be divided in late autumn or early spring. The resulting plants should be left undisturbed for some years to obtain good clumps. Aconites are hardy if covered in the winter with leaves or other protection.

A bit of botanical history

Modern scientific names begin with the year 1753 when Linnæus published his Species Plantarum. In this work he recognized five species of Aconitum, *A. Lycoctonum*, *A. variegatum*, *A. Napellus*, *A. pyrenaicum*, *A. Anthora*. Unfortunately for some of these, especially the first and third, he included in his references to earlier works a number of different things, so that there have been considerable difficulty and lack of agreement as to exactly which of these each name should apply, especially when there is no specimen in his herbarium. Under *A. Lycoctonum*, for example, he included plants from Scandinavia, Switzerland, Austria, Italy. The Scandinavian plants have flowers lilac in color and differ in many ways from the yellow-flowered ones of central Europe. The tendency now is to restrict the species name *Lycoctonum* to the plants of Linnæus' own country Sweden, and use later names for the others. In the case of *A. Napellus* some workers give up the name altogether because of the confusion involved, since at least four different entities appear in the Linnæan references and since the only specimen in his herbarium is not one of these four. In Species Plantarum,

253. ACONITUM RECLINATUM. Branching root system of the Lycoctonum group.

edition 2, 751, 1762, Linnæus added two other species, one being *A. Cammarum*, in the references under which he included at least three different things and his herbarium contains not one specimen.

The beginnings of scientific nomenclature for the genus were, therefore, not very clear. Other species were proposed, however, and by 1818 De Candolle in his Systema Naturæ (i, 364–381) recognized twenty-eight. Then came the works of Reichenbach on Aconitum (Uebersicht, 1819; Monographia, 1820; Illustratio, 1823–27; Icones Fl. Germ. iv, 1840) in which many new entities were proposed and illustrated. Sometimes the illustrations were inaccurate, sometimes the rank, whether as species or variety, varied from one work to the next. Apparently many of the names proposed were based on very trivial characters. Not working under modern rules of nomenclature, Reichenbach would overthrow an earlier name and propose a new one. While he worked largely with European species, he did deal with some Asiatic ones, many of which have been poorly understood, such as *A. japonicum* and *A. Fischeri*. It is not surprising, then, that with the identification of the species so uncertain, some of the names should have been wrongly applied to garden plants and that a given name like *A. Napellus* is used for several entirely different plants.

In preparing this paper I have had access to perhaps 1800 sheets of herbarium material obtained from the Gray Herbarium at Harvard University, the New York Botanical Garden, the Chicago Natural History Museum, the Bureau of Plant Industry, the Botany Department of Cornell University, and the Bailey Hortorium. To those in charge of these various collections I am greatly indebted, as well as to Florence Mekeel for her excellent and accurate drawings.

My interpretation of species depends largely on the writings of Stapf on the Indian species (Ann. Roy. Bot. Gard. Calcutta, x, 115–197, plates 92–116, 1905), of Gáyer on the European ones (Magyar Bot. Lapok, viii, 114–206, 310–327, 1909, and in Hegi, Illust. Fl. Mitt.-Eur. iii, 492–507, 1909), and of Handel-Mazetti on the Chinese plants (Act. Hort. Gotoburg, xiii, 64–132, 1939). Innumerable other works have also been consulted; at present the species of Siberia and Japan seem most difficult to identify.

Unfortunately, outside of the specimens in the Bailey Hortorium, there is very little cultivated material in herbaria, so that, while a real attempt was made to secure fresh plants from nurseries and botanical gardens, for many of the names less frequent in the trade no actual specimens were available. This situation is unfortunate, as can be seen from the fact that plants cultivated under a given name may represent three or four quite different things. The best I can do under the circumstances is to key, describe and figure the species known to be in the trade, with the hope that growers can identify their plants or submit them for identification.

The flower

The floral structure is peculiar and specialized. The conspicuous and colored parts of the flower are the five sepals: the largest and upper one (the helmet or hood) being arched, rounded-conical or almost cylindrical; the two lateral ones varying from round to reniform; and the two lower ones narrower and less showy. Of the true petals only two are much developed; these grow up into the helmet and each consists of an elongate narrow part (the claw) bearing at its summit a capitate to recurved or coiled gland-like nectariferous part (the spur), and an expanded more or less pendant lip-like part (the lamina). The stamens are numerous and expanded-membranous in their lower portion and narrowed-filamentous in their upper part. The carpels are entirely separate, usually three to five in number, and become follicles in fruit. Seeds are rather numerous, three-cornered, sometimes variously winged: longitudinally on the angles, or with transverse membranous outgrowths. All the above parts grow from the conspicuously thickened receptacle at the tip of the pedicel. (See Fig. 252.)

Key to species of Aconitum to be expected in cultivation

A. Helmet conic to cylindric, at least twice as high as long on the basal margin: leaf-segments usually wide: stems from elongate fascicled roots: seeds dark, 3-winged on angles. (Section Lycoctonum DC.)

B. Flowers purplish or violet to pink.

C. Upper parts of plant more or less twining: racemes many, short: leaves 3-lobed. Eastern Siberia. . . . . 5. *A. albo-violaceum*

CC. Upper parts of plant not twining.

D. Helmet 5–7 mm. high, about as long on lower margin. India. . . . . 7. *A. novoluridum*

DD. Helmet 20–25 mm. high, not so long. Europe. . . . . 2. *A. Lycoctonum*

BB. Flowers yellow or white.

C. Hairs of inflorescence spreading: leaf-blades cut into narrow segments mostly 1–5 mm. wide. Spain. . . . . 4. *A. pyrenaicum*

CC. Hairs of inflorescence crisped or appressed: ultimate segments of leaves wider.

D. Plant low, 4–10 dm. tall: racemes dense.

E. Flowers small, helmet 12–14 mm. high: leaves 9–10 cm. wide. Russia. . . . . 8. *A. lasiostomum*

EE. Flowers larger, helmet 18–22 mm. high: leaves up to 15 cm. wide. Eastern Asia. . . . . 6. *A. barbatum*

DD. Plant taller, usually more than 10 dm. high: racemes lax.

E. Helmet strongly sinuate in front: flowers pale yellow. Central Europe. . . . . 1. *A. Vulparia*

EE. Helmet almost straight in front.

F. Flowers white; helmet 10–13 mm. high. Southeastern United States. . . . . 9. *A. reclinatum*

FF. Flowers ochroleucous; helmet about 20 mm. high. Caucasus. . . . . 3. *A. orientale*

AA. Helmet arched to conic-hemispheric, lower: leaf-segments usually narrow: stem from a biennial collateral tuber renewed each year.

B. Sepals persistent around the developing follicles, mostly yellowish to yellow-white; helmet strongly arched: leaves dissected into numerous linear lobes: seeds dark, 3-angled, not winged on angles nor transversely lamellate. Europe to Siberia. (Section Anthora DC.) . . 10. *A. Anthora*

BB. Sepals deciduous, purplish or blue to white; helmet hemispheric to rounded-conic: leaf-segments linear to lanceolate or wider: seeds brownish, somewhat winged on angles, sometimes transversely lamellate on the faces. (Section Napellus DC.)

C. Stems twining, or at least flexuous above, with strongly flexuous or twining or spreading-deflexed slender branches in the inflorescence.

D. Pedicels spreading-pubescent.

E. Leaf-blades divided to base: helmet 13–15 mm. long on the lower margin, considerably taller, strongly sinuous above the beak. Eastern Asia. . . . . 26. *A. volubile*

EE. Leaf-blades not divided to very base: helmet 15–20 mm. long on the lower margin, not strongly sinuous on the front margin above the beak. North America.

F. Leaves mostly 5-cleft: lower pedicels often longer than the flowers: helmet taller than long (length of lower margin). Western. . . . . 18. *A. columbianum*

FF. Leaves mostly 3-cleft: lower pedicels usually shorter than flowers: helmet scarcely taller than long. Eastern. . . . . 19. *A. uncinatum*

DD. Pedicels crisp-pubescent to almost glabrous.

E. Leaf-blades mostly trifid nearly or quite to base. China.

F. Helmet 16–22 mm. high; blade of petal 3–4 mm. long: carpels more or less pubescent. . . . . 25. *A. Vilmorinianum*

FF. Helmet about 25 mm. high; petal-blade 6–7 mm. long: carpels glabrous. . . . . 23. *A. Henryi*

EE. Leaf-blades divided only to some distance from base.

F. Leaves coriaceous, the divisions mostly with rather few and not very deep broad teeth: filaments pilose. Japan. . . . . 24. *A. japonicum*

FF. Leaves thin, divisions sharply sublaciniately toothed: filaments glabrous. Manchuria to Siberia. . . . . 16. *A. Fischeri*

CC. Stems stiffly erect, simple or with few ascending or suberect stiff branches in the inflorescence.

D. Leaves (at least the upper cauline ones) not or scarcely lobed, more or less cordate to clasping and crenate-dentate. Northern India. . . . . 21. *A. heterophyllum*

DD. Leaves deeply lobed.

E. The leaf-blades not divided to very base, but with at least a small disk of tissue several mm. wide.

F. Pedicels crisp-pubescent.

G. Leaves thin, light green, equally 5-parted: helmet sinuous on front margin above the 5 mm. long beak. Manchuria to Kamtchatka. . . . . 16. *A. Fischeri*

GG. Leaves coriaceous, dark green, 3-parted, the lateral parts then soon bilobed: helmet almost straight on front margin, scarcely beaked. China. . . 15. *A. Carmichaelii*

FF. Pedicels spreading-pubescent.

G. Helmet hemispheric in outline, almost as long as high, sloping on the front to a descending beak: carpels 5. Northern India.....20. *A. ferox*

GG. Helmet rounded-conic, almost vertical above the beak: carpels 3.

H. Leaves coriaceous: helmet almost straight on lower margin, 15–20 mm. high. Asia.....17. *A. chinense*

HH. Leaves thin: helmet curved on lower margin, 18–25 mm. high.

I. Leaf-blades mostly 5-cleft: helmet taller than long: carpels usually somewhat pubescent. Western America.....18. *A. columbianum*

II. Leaf-blades mostly 3-cleft: helmet about as tall as long: carpels glabrous. Eastern United States.....19. *A. uncinatum*

EE. The leaf-blades divided to very base.

F. Helmet low, hemispheric, somewhat crescentic in outline, slanting gradually in front; lateral sepals usually wider than long: plant mostly less than 6 dm. high: leaves few, with few linear lobes and petioles mostly as long as blades. Northwestern America and eastern Siberia. .....22. *A. delphinifolium*

FF. Helmet taller, more arched, not crescentic, more vertical in front; lateral sepals usually not so wide as long: plant mostly over 6 dm. high: leaves usually many and the cauline ones rather short-petioled. Europe.

G. Filaments pilose.

H. Pedicels pubescent, with spreading or appressed hairs.....11. *A. Napellus*

HH. Pedicels glabrous.

I. Leaf-segments linear, 1–3 mm. wide, or if lanceolate and 2.5–5 mm. wide, then the flowers mostly deep blue, not more than 3 cm. high and the helmet not gaping: inflorescence dense and not branched: plant fertile.....11. *A. Napellus*

II. Leaf-segments lanceolate, 2.5–5 mm. wide: flowers mostly spotted blue or white, 3–4 cm. high, helmet gaping: inflorescence branched: plant sterile.....14. *A. bicolor*

GG. Filaments glabrous.

H. Leaf-segments linear, 1–3 mm. wide: inflorescence dense, subsimple: seeds smooth on the faces. .....11. *A. Napellus*

HH. Leaf-segments wider: inflorescence paniculate: seeds with undulating horizontal membranous plates on the faces.

I. Pedicels with spreading glandular pubescence: lamina of petal 6–7 mm. long....12. *A. paniculatum*

II. Pedicels glabrous: lamina of petal about 10 mm. long.....13. *A. variegatum*

1. **Aconitum Vulparia** Reichb. Illust. Acon. plates 56–58 excl. *A. moldavicum* and *A. triste* (1827). Fig. 252.

A. Lycoctonum Authors, not Linn.

Perennial; rootstock subcylindric, often branched, with fibrous roots; stem erect, 5–15 dm. high, simple or branched in inflorescence, subglabrous to somewhat strigulose below, more densely strigulose above and in inflorescence: leaves suborbicular to orbicular-reniform in outline, palmately 5–7-cleft, the divisions rhomboid in outline, trifid toward their apex with each part coarsely few-toothed, quite glabrous and deep green above, paler beneath and somewhat pilose on veins and on margins; lowest leaf-blades 5–22 cm. wide on pilose petioles as long or longer, both blade and petiole gradually reduced up the stem until passing into the subsessile leafy bracts of the lower inflorescence: inflorescence open, usually with few mostly arcuate-ascending branches, strigulose, peduncled, the whole forming as much as the terminal fourth or third of the plant; flowers pale yellow, rather crowded, upper bracts simple, linear, 5–15 mm. long; pedicels reverse-strigulose, strongly ascending, the lowest equalling or exceeding the helmet; helmet conic-cylindric, vertical, somewhat narrowed in middle, 15–20 mm. high, 5–8 mm. wide, the lower margin 10–15 mm. long and concave ending in a short decurved beak, the whole strigose on outer surface; lateral sepals rounded-obovate, 8–10 mm. long, strigose near middle, yellow-pilose within especially toward margin; lower sepals elliptical, 8–10 mm. long, 3–4 mm. wide, with same pubescence; upper petals erect, extending into tip of helmet, glabrous, the claws scarcely curved, the spur recurved in a semi-circle, the lamina pendant, 4–5 mm. long; stamens glabrous, the filaments dilated in lower half and gradually narrowed upward, anthers purplish: follicles inflated, veiny, 10–20 mm., mostly about 15 mm. long, usually glabrous; seeds somewhat 3-angled, dark, with irregular transverse plates.

Aconitum Vulparia is native to southern and middle Europe and the commonest plant of the Lycoctonum group (with long cylindrical helmet and broadly lobed leaves) in Europe. The name *Vulparia* is in the trade and although I have seen no cultivated specimens referrable here, I should expect most references to yellow-flowered *A. Lycoctonum* to belong to *A. Vulparia*.

The name *Vulparia* (from Latin *vulpes* or fox because of the use for poisoning foxes and wolves) is applied to an exceedingly variable entity. Whether maintained as a separate species or as a subspecies of *A. Lycoctonum*, it in turn has a number of varieties and forms based on habit, pubescence, and similar characters.

2. **Aconitum Lycoctonum** Linn. Sp. Pl. 532 (1753).

A. septentrionale Koelle, Spic. Acon. 22 (1788).

Plant tall: leaves round to somewhat reniform, lower ones 1.5–2 dm. wide, cauline ones gradually reduced, thin, 5–7-partite, the divisions trifid about half-way out, then deeply laciniate-serrate, sparsely pilose above,

slightly more so beneath especially along the veins; petioles pilose, the lower ones very long: inflorescence an elongate raceme, simple or with few small lateral racemes at the base, all glandular-villous; pedicels arcuate-ascending, the lower ones exceeding the flowers, these purple-lilac, pubescent; helmet conic-cylindric, 18–21 mm. high, 3–6 mm. wide, basally 14–17 mm. long; spur of petals subspirally loosely coiled: carpels glabrous.

Sweden, Norway, and apparently the same plant in northwestern Russia, which material is sometimes referred to *A. excelsum*, Reichb. (Illus. Acon. 53, 1827), a species described originally from Lake Baikal, Siberia and which seems specifically different in its more glabrous leaves and more villous carpels.

Many writers now restrict the use of the name *A. Lycoctonum* to this lilac-colored north European species. Although both names *Lycoctonum* and *septentrionale* are in the trade, I have seen no lavender-flowered garden plants.

3. **Aconitum orientale** Mill. Gard. Dict. Ed. 8, no. 10 (1768).

A. ochroleucum Willd. Sp. Pl. ii, 1233 (1799) or later, not Salisb. 1796.

Plant with general habit of *A. Lycoctonum*, tall, stems quite glabrous: leaves large, more glabrous especially above: inflorescence a large open panicle, adpressed-pubescent; pedicels shorter than flowers; flowers ochroleucous, pubescent; helmet conic-cylindric, about 2 cm. high, 3.5–4.5 mm. wide, 10–12 mm. long on lower margin; spur of petals loosely spirally coiled, lip lanceolate: carpels glabrous.

The Caucasus. The name *A. orientale* occurs in the trade, but I have seen no cultivated specimens except one from Kew. This seems to belong here. The same specific name has been used also for a plant from the Pyrenees of the Napellus group.

4. **Aconitum pyrenaicum** Linn. Sp. Pl. 532 (1753). Fig. 252.

A. Lycoctonum var. *pyrenaicum* Séringe, Mus. Helv. i, 133 (1823).

Plant 3–8 dm. high, villous more or less throughout but especially on lower stem and on flowers, mostly simple: leaves rather few, the basal 8–15 cm. wide and very long-petioled, all reniform-orbicular, divided almost to base, the divisions narrowly laciniate-incised, cauline leaves gradually reduced up the stems: racemes long, simple or few-branched at base, rather compact; pedicels erect or strongly ascending, shorter than flowers; flowers yellow; helmet conic-cylindric, strongly indented on front margin, 16–19 mm. high, 3–6 mm. wide, basally 11–13 mm. long; sepals shaggy-pubescent without, bearded within near the margins; spur somewhat coiled: carpels usually villous.

Native of the Pyrenees. An old name in the trade, but no cultivated plants have been seen. The name *A. neapolitanum* has been confused with it and is much like it in the narrow leaf-segments and yellow flowers, but

differs in the appressed hairs of the inflorescence. A cultivated specimen labelled *A. japonicum* seems to be *A. neapolitanum;* for a discussion of the name *japonicum* see species number 24.

5. **Aconitum albo-violaceum** Komar. in Act. Hort. Petrop. xviii, 439, pl. 5 (1901).

Stems flexuous or scandent: leaves 10–15 cm. wide, 3-lobed to 2–3 cm. from base, thin, with coarse oblong-ovate abruptly mucronulate teeth, the lobes ovate, acuminate at apex: racemes several, short, paniculately arranged, with spreading yellow hairs; pedicels up to 15 mm. long; flowers white-violet, the helmet about 18 mm. long, 2.5–3 mm. thick and curved at apex; spur of petals long-recurved: carpels yellow-hirsute.

Northern China (Hopei) to Manchuria and Korea. Occasional in the trade, no garden specimens seen.

6. **Aconitum barbatum** Pers. Syn. Pl. ii, 83 (1807).

Stems erect, 5–10 dm. high: leaves rounded in outline, 5-cleft almost to base, the divisions dissected subpinnately into linear or oblong lobes; lowest leaf-blades up to 15 cm. wide; stem-leaves few, gradually reduced up the stem: flowers yellow to white, in few dense racemes in a loose panicle, inflorescence crisp-pubescent; pedicels mostly less than 1 cm. long, strongly ascending; helmet 2–2.5 cm. long, rounded at apex; lower sepals strongly yellow-bearded at margin; spur of petals erect to slightly hooked.

China (Shansi, Hopei) to Mongolia and eastern Siberia. Name occasional in the trade, no specimens seen from cultivation.

† 7. **Aconitum novoluridum,** nom. nov.

A. luridum Hook. f. & Thoms. Fl. Ind. i, 55 (1855), not Salisb. Prod. 375 (1796).

Erect, up to 8 dm. high: leaves few, round-cordate to reniform in outline, 5–8 (12) cm. wide, 5-parted to three-quarters or more of way to base, the divisions cuneate-obovate, 1.5–3 cm. wide, sharply toothed: inflorescence racemose, up to 40 cm. long, rather dense, mostly simple, spreading-pubescent; flowers reddish to purplish, hairy; helmet broad, 5–7 mm. high, about as long on lower margin; lateral sepals 9–11 mm. long; petals hammer-shaped, the spur obtuse, not coiled: carpels 3, usually densely hairy.

Himalayas. The name *luridum* is in the trade. The name is not tenable as applied to Indian plants because of Salisbury's earlier use of it for a plant near to *A. variegatum* (Rapaics, Növ. Közl. vi, 152, 1907).

8. **Aconitum lasiostomum,** Reichb. Illust. Acon. pl. 49 (1823–27).

A. pallidum, Reichb. op. cit. pl. 50.

Erect, up to 1 m. tall: leaves few, round to reniform in outline, 9–10 cm. wide, densely pilose on both surfaces, the divisions slightly incised, coarsely serrate: inflorescence an elongate narrow raceme, dense, sometimes with a

254. ACONITUM RECLINATUM. Flowers with the narrow helmet of the Lycoctonum group.

few small dense lateral racemes, crisp-pubescent; pedicels shorter than flowers, strongly ascending; sepals pale yellow or ochroleucous; helmet conic-cylindric, 12–14 mm. tall, 3–5 mm. wide, 9–12 mm. long on lower margin.

Russia (provinces Tambov, Rjäsan). The name is in the trade; no garden plants have been seen.

9. **Aconitum reclinatum,** Gray, in Amer. Journ. Sci. xlii, 34 (1842). Figs. 253, 254, 255.

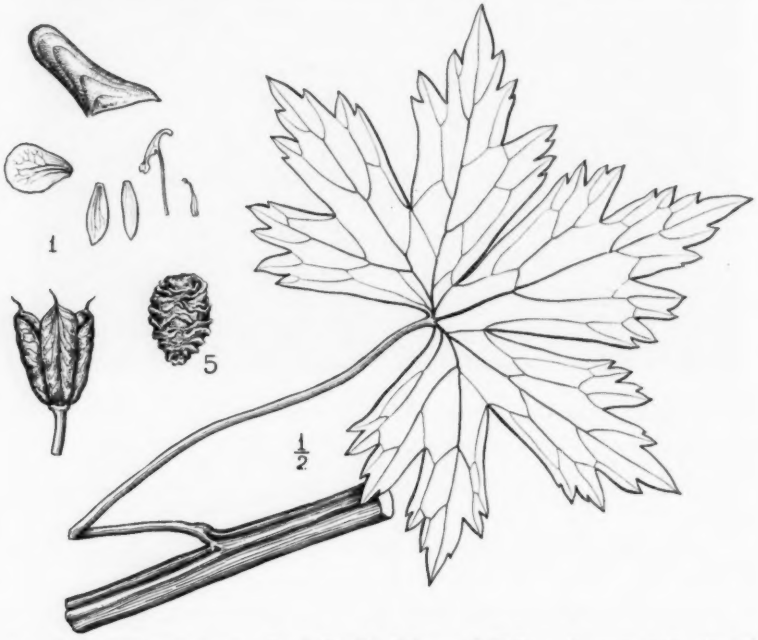
Trailing to diffusely erect, 6–20 (25) dm. long: leaves reniform in out-

line, 3–7-cleft, the divisions rhombic-obovate, somewhat 3-lobed and with few large sharp or mucronulate teeth near tips, subglabrous to somewhat pilose, lower ones 12–20 cm. wide on longer petioles, cauline ones gradually reduced up the stem: plant almost glabrous below, strigulose in inflorescence, this an open panicle of rather loose racemes on very slender branches; pedicels slender, arcuate-divergent, the lower longer than the white flowers; helmet almost horizontal, subconic, 10–13 mm. high, 4–7 mm. wide in middle, 10–12 mm. long on lower margin; sepals somewhat strigulose without, bearded within near margins; spur curved in half circle: carpels 3, usually slightly pubescent.

Southern Alleghanies. Not always trailing, as usually stated; occasional in the trade.

10. **Aconitum Anthora,** Linn. Sp. Pl. 532 (1753). Fig. 256.

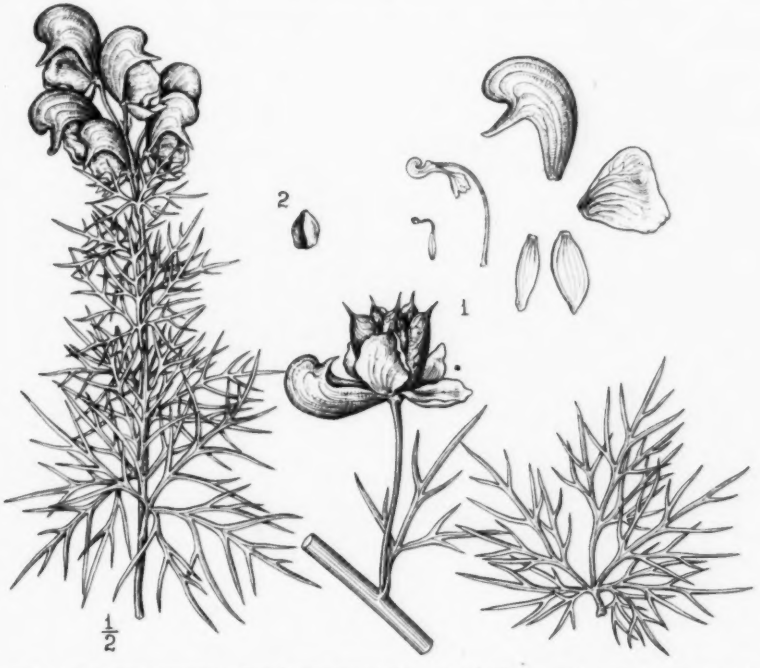
Perennial, 2–10 dm. tall; tubers elongate, mostly 2–3 cm. long; stems erect or ascending, mostly simple, subglabrous below, crisp-pubescent above and in inflorescence with reflexed hairs, densely leafy: leaves suborbicular in outline, 5–7-palmate to base, the parts in turn subpinnately laciniate into ultimate linear lobes mostly 1–2.5 mm. wide, subentire, acute



255. Aconitum reclinatum. Leaf, details of flower, follicles and transversely winged seed.

to obtuse, subglabrous on upper surface, often strigulose beneath; basal leaf-blades 5–15 cm. wide, on longer petioles; cauline ones 4–10 cm. wide, gradually reduced upward and petioles shorter, until leaves sessile at base of inflorescence: inflorescence simple or with few ascending basal branches, 5–15 (30) cm. long, crowded, lower bracts foliose, upper linear, subsimple, 4–8 mm. long; pedicels mostly erect-ascending, usually equalling or exceeding flowers, crisp-pubescent; flowers pale yellow; sepals persistent, the helmet hemispheric, crisp-pubescent without, glabrous within, with rather long hairs on margin, 1.5–2 cm. tall, almost as wide, strongly arched, sinuate in front, concave on lower margin, with short beak descending-spreading, about 3 mm. long; lateral sepals rounded-obovate, 10–12 mm. long, strigulose or somewhat pilose without, scattered-pilose within and on margin; lower sepals elliptical, 9–12 mm. long, 4–6 mm. wide, with the pubescence of the lateral ones; upper petals with claws incurved and strongly bent below the summit, the spur capitate-incurved, the laminæ expanded, obcordate, about 4 mm. long; filaments glabrous, winged about half their length: carpels 5, erect, densely pilose, 11–13 mm. long, with divergent indurate styles 3–4 mm. long; seeds blackish-gray, pyramidal.

This, the common form of the species, is native in southern Europe from the Pyrenees to the Alps, Transylvania and Serbia.



256. ACONITUM ANTHORA. Sepals persistent about the follicles; seed angled, not winged.

Several variants are recognized:

A. Anthora var. **atrovirens** DC. Syst. Nat. i, 366 (1818).

A. Anthora f. *atrovirens* Gáyer, in Magyar Bot. Lapok, viii, 125 (1909).

A. Anthora var. *grandiflorum* Reichb. Mon. Acon. 63, pl. 1 fig. B (1820).

Pubescence adpressed: flowers more intensely colored, orange. Pyrenees.

A. Anthora var. **Jacquinianum** Séringe, Mus. Helv. i, 130 (1823).

A. Jacquini Reichb. Mon. Acon. 65, pl. 2 (1820).

A. Anthora var. *tenuifolium* Reichb. Illust. Acon. pl. 60 app., pl. 59 text (1823–27).

Pubescence adpressed: helmet with a slender beak 6–10 mm. long. From the Basses-Alpes of southeastern France to Hungary.

A. Anthora var. **cæruleum** Hoelzl, in Verh. Zool. Bot. Ges. xviii, 409 (1868), ex Knapp, Pfl. Galiz. 293.

A. Anthora f. *cæruleum* Gáyer, in Magyar Bot. Lapok, viii, 127 (1909).

A. tenuisectum Schur, in Verh. Brünn, xv, pt. ii, 65 (1876).

Pubescence adpressed: sepals blue-violet. Galicia.

A. Anthora var. **velutinum** Reichb., Icon. Fl. Germ. iv, 25, fig. 4711 B (1840).

A. Anthora var. *patulum* Rouy-Fouc., Fl. France, i, 136 (1893).

A. Anthora var. *collinum* Schur, Enum. Pl. Transs. 30 (1866).

A. Anthora f. *collinum* Gáyer, in Magyar Bot. Lapok, viii, 126 (1909).

A. anthoroideum DC. Syst. Nat. i, 366 (1818); *A. pyrenaicum* Pall. Itin. ii, 316 (1771–76).

Inflorescence with spreading hair. Pyrenees to Hungary; and according to Handel-Mazetti (Act. Hort. Gotoburg, xiii, 86, 1939) to Siberia (Altai region).

Aconitum Anthora is recognized by its low habit, compact flower-cluster, finely dissected leaves, persistent yellowish sepals. It is offered in many catalogues, but I have seen no cultivated plants. The name comes from *anti* (against) and *thora* (*Ranunculus Thora*, a poisonous plant), because it was supposed to be effective against this other poison. Among the horticultural names is var. *aureum* Hort. ex Davis (in Bailey, Stand. Cyclo. Hort. i, 210, 1922) in which the flowers are said to be "deeper yellow." I have seen no specimens; it may be the same as var. *atrovirens*.

Aconitum Pallasii Reichb. (Mon. Acon. 72, pl. 6, 1820) is closely related to *A. Anthora; A. confertiflorum* Gáyer (Magyar Bot. Lapok, viii, 128, 1909) is a synonym. It comes from the Caucasus and is characterized by spreading pubescence, very narrow leaf-segments and supposedly pubescent filaments, with petal-claws more gradually curved. In addition to the usual yellow type there is a bluish one, *A. versicolor* Stev. ex Ledeb. (Fl. Ross, i, 66, 1841, *A. Anthora* var. *versicolor* Séringe, Mus. Helv. i, 132, 1823), also from the Caucasus.

11. **Aconitum Napellus,** Linn. Sp. Pl. 532 (1753).

A. Linneanum Gáyer, in Magyar Bot. Lapok, viii, 157 (1909).

Tuber mostly 2–4 cm. long, 0.5–1.8 cm. thick; stems erect, strict, rather slender, up to 8 or 9 dm. tall, almost glabrous below, densely crisp-pubescent at summit, rather leafy: leaves reduced just below the inflorescence, otherwise mostly about 5–10 cm. wide, scarcely cordate at base, subglabrous to slightly pubescent on both surfaces, trifid to base, the 2 lateral lobes divided almost to the base, all 5 divisions somewhat cuneate in lower half, mostly deeply trifid then 2–3-fid into few ultimate lanceolate acute segments usually 3–5 (7) mm. wide: inflorescence a simple dense raceme 5–15 (20) cm. long, sometimes with few short ascending basal branches, crisp-puberulent; pedicels mostly shorter than flowers, straight or arcuate, the lowermost not much elongate, bracts lance-linear; flowers violet, pubescent without, 3–3.5 cm. high; helmet hemispheric above, about 2 cm. high, fairly straight in front, short-beaked, almost straight and 18–20 mm. long on lower margin; lateral sepals round-obovate, scattered-pilose within, 15–17 mm. long; lower sepals elliptic-oblong, 12–16 mm. long, 4–7 mm. wide, pilose within; claw of petals strongly curved; spur rounded, hemispheric, lamina elongate, spatulate; filaments pilose, narrowed gradually near middle: carpels 3, usually glabrous, 12–16 mm. long in fruit; seeds 3-angled, 4 mm. high, narrowly winged on edges.

If we take this Swedish plant as the one with which Linnæus was most familiar and to which three of his references in Species Plantarum apply, and therefore the true *Napellus*, it does not seem to be common in the trade. I have seen two collections of garden plants that fit its description. It has the ultimate leaf-segments 5 mm. or more wide, appressed hairs in the flower-cluster, the lower pedicels not much longer than the upper, and the helmet about as high as long.

Closely related to the Scandinavian plant but separated from it as species by Gáyer (Magyar Bot. Lapok, viii, 140–185, 1909) or treated as subspecies by the same writer (in Hegi, Illust. Fl. Mitt.-Eur. iii, 495–500, 1909), or by others as varieties or partly in one category and partly in another, there is a most puzzling group of plants largely European in origin. To bring them before us, I hereby present a key for a few of the

common ones, treating them as of specific rank and then giving a short discussion:

A. Inflorescence glabrous, racemose, nearly or quite simple, the pedicels about equally long: ultimate leaf-segments linear. Eastern Alps, Transylvania. ..... 11a. *A. tauricum*

AA. Inflorescence pubescent.

B. Pedicels appressed to axis of inflorescence, the lower scarcely longer than the upper: inflorescence rather simple.

C. Ultimate leaf-segments lanceolate, acute, 5 or more mm. wide. Scandinavia..... 11. *A. Napellus*

CC. Ultimate leaf-segments linear, elongate, acuminate, mostly 2–4 mm. wide.

D. Leaves mostly 5–8 cm. wide; primary leaf-segments 4–8 mm. wide below their lobing. Switzerland..... 11c. *A. compactum*

DD. Leaves mostly 10–15 cm. wide; primary leaf-segments 10–18 mm. wide below lobing. Britain..... 11b. *A. anglicum*

BB. Pedicels divergent, the lower often elongate: inflorescence often subpaniculate.

C. Leaf-segments 2–4 mm. wide, linear: helmet 14–17 mm. long on lower margin. Eastern Alps..... 11d. *A. Lobelianum*

CC. Leaf-segments 4–7 mm. wide, lanceolate.

D. Helmet 15–20 mm. long on lower margin: floral bracts linear. Western Germany, eastern Alps to Austria..... 11e. *A. neomontanum*

DD. Helmet 20–27 mm. long: floral bracts lanceolate to ovate. France and Belgium to Bavaria and Switzerland..... 11f. *A. pyramidale*

11a. **Aconitum tauricum** Wulfen, in Koelle, Spic. Acon. 15 (1788); Jacq. Coll. ii, 112 (1788).

A. Napellus var. *tauricum* Séringe, Mus. Helv. i, 153 (1823).

A. Napellus subsp. *tauricum* Gâyer in Hegi, Illust. Fl. Mitt.-Eur. iii, 496 (1909).

A. Cammarum Linn. Sp. Pl. Ed. 2, 751 (1762), in part.

A. Koelleanum Reichb. Mon. Acon. 85, pl. 11 (1820).

A. taurericum Reich. op. cit. 86, pl. 12, fig. 23.

A. Napellus var. *spicatum* Séringe, op. cit. 154.

Robust plant up to 6 dm. tall, glabrous (inflorescence more or less pilose in f. *taurericum*), densely leaved: leaves short-petioled, 5–7-fid, with ultimate sublinear segments 1–4 mm. wide: racemes dense, simple, conspicuously leafy-bracted below; flowers dark violet, mostly glabrous without; helmet hemispheric, broadly rounded above, acute at apex, 12–20 mm. long on the almost straight lower margin; spur somewhat capitate or reduced, the claw mostly glabrous.

Native in the eastern Alps and Transylvania. The name is occasional in the trade; I have seen no cultivated material. Variable as to height and pubescence and with a number of named botanical forms and varieties.

11b. **Aconitum anglicum** Stapf, in Bot. Mag. t. 9088 (1926).

Stem to 1 m. tall, simple, crisp-puberulent in upper parts: leaves 5–3-partite, mostly 10–15 cm. wide, the middle segment cuneate for 3–5 cm. and becoming 8–16 mm. wide, then deeply laciniate with lobes linear to narrowly linear-lanceolate, ultimately with few narrow lobules or teeth: racemes fairly dense, 20–50 cm. long, simple or with few basal branches; lower pedicels not much elongate; flower "mauve to mauvish blue," puberulent; helmet subhemispheric, 18–20 mm. high, 12–18 mm. long on lower margin, slightly oblique on front margin and somewhat beaked; lower sepals unequal in width; spur capitate: carpels glabrous, 2 cm. long in fruit.

Southwestern and western England and eastern Wales. In cultivation in England and to be expected here, its very long dense racemes being conspicuous.

11c. **Aconitum compactum** Reichb. Uebers. Acon., 27 (1819), nomen?

A. Napellus var. *compactum* Reichb. Illust. Acon., text and pl. 2 (1823–27).

A. Napellus subsp. *compactum* Gáyer, in Hegi, Illust. Fl. Mitt.-Eur. iii, 497 (1909).

Plant robust, up to 1 m. high, crisp-puberulent above: ultimate leaf-segments linear, 2–3 mm. wide: inflorescence compact, mostly simple; helmet pubescent without, semicircular, 12–17 mm. long in the weakly curved lower margin; spur of petal definitely capitate; filaments pilose: carpels to 20 mm. in fruit.

Native in the western Alps. Exceedingly variable with named varieties and forms for white, blue and white, reddish-blue and other sorts. The name is not in the trade, but an old specimen from Kings County, New Brunswick, at the Gray Herbarium seems to come here.

11d. **Aconitum Lobelianum** Host, Fl. Austr. ii, 74 (1831).

A. Napellus var. *Lobelianum* Reichb. Illust. Acon. pl. 3 (1823–27), in part.

A. Napellus subsp. *Lobelianum* Gáyer, in Hegi, Illust. Fl. Mitt.-Eur. iii, 499 (1909).

Up to 1 m. tall: leaves 5-fid, the ultimate lobes almost linear, acuminate, the middle primary lobe petiolulate: inflorescence slightly branched, elongate, crisp-pubescent to subglabrous, with lower pedicels elongate; flowers violet, pubescent to subglabrous; helmet 15–20 mm. high, 14–17 mm. on lower margin where strongly curved.

Native in eastern Alps. Variable as to color and pubescence. Name not in the trade, but the plant must have been in early cultivation in the New World, having been collected in Newfoundland (Brig Bay, *Fernald, Long & Dunbar 26701*, St. John's, *Robinson & Schrenk* in 1894), in New Bruns-

wick (Rothegay, *Chadbourne* in 1883), in Vermont (Hancock, *E. F. Williams* in 1908), and in New York (Caroline Center, *Eames & Wiegand 12072*). An almost glabrous blue and white to white form (f. *albiflorum* Reichb.) has also been found at Brig Bay, Newfoundland (*Fernald, Long & Dunbar 26700*).

11e. **Aconitum neomontanum** Wulfen, in Koelle, Spic. Acon. 16 (1788).

A. neubergense DC. Syst. Nat. i, 373 (1818).

A. eminens Koch, in Flora, ii, 646 (1819); in Reichb. Illust. Acon. pl. 69 (1823–27).

One m. or more tall, crisp-pubescent in upper parts: leaves 7–10 cm. wide, deeply 5–7-fid, with short lanceolate ultimate segments 4–7 mm. wide: inflorescence branched and with lower pedicels elongate; bracteoles linear; flowers pubescent, mostly about 3 cm. high; helmet about 20 mm. high, broadly rounded on top, slightly beaked, the lower margin somewhat curved, about 20 mm. long; petal-spur capitate; filaments pilose: carpels glabrous.

Hesse (Germany) and eastern Alps to lower Austria. Agreeing with *A. Napellus* and *A. pyramidale* in broad leaf-segments and with the latter in broad inflorescence but with smaller flowers and linear bracts. Variants as to stature, pubescence, and the like have been described. I have seen cultivated plants from botanical gardens and drug gardens.

11f. **Aconitum pyramidale** Mill. Gard. Dict. Ed. 8, no. 6 (1768); Reichb. Illust. Acon. pl. 68 (1823–27). Fig. 257.

A. autumnale Reichb. Mon. Acon. pl. 17, fig. 2 (1820), not *A. autumnale* Lindl., a Chinese plant.

A. elatum Salisb. Prod. 375 (1796).

A. Napellus var. *bracteolosum* DC. Syst. Nat. i, 372 (1818).

Plant tall, often over 1 m. high, crisp-pubescent in inflorescence: leaves mostly 7–15 cm. wide, 5–7-fid, the ultimate segments lanceolate, 4–7 mm. wide, heavily veined beneath: inflorescence with lower pedicels elongate and usually with basal lateral racemes; bracteoles commonly lanceolate to ovate; flowers usually 3.5 cm. long, violet, pubescent; helmet broadly rounded above, 20–24 mm. high, somewhat sinuate on front margin, short-beaked, strongly arcuate and 18–23 mm. long on lower margin; petal-spur capitate; filaments pilose: carpels glabrous, 15–20 mm. long in fruit.

Belgium and France to Bavaria and Switzerland. Apparently the commonest form of the *Napellus* group in cultivation, usually as *A. Napellus* or *A. Napellus pyramidale* or *pyramidatum*. It is characterized by the large strongly arched helmet, crisped pubescence, broad leaf-segments, branched inflorescence, broad bracteoles. Much material sold as *A. Napellus* does not come here, but in *A. bicolor* and elsewhere. The f. *albidum*

257. ACONITUM PYRAMIDALE. Upper middle, seed with narrow longitudinal wings of Napellus group.

(Bernh.) Gáyer, in Hegi, Illust. Fl. Mitt.-Eur. iii, 500, has whitish flowers. I have seen cultivated specimens under the name "A. Napellus album" which seem to be this form.

12. **Aconitum paniculatum** Lam. Fl. France, iii, 646 (1778).

A. cernuum Reichb. Illust. Acon. pl. 33 (1823–27), not Wulfen.

Tubers 1–2.5 cm. long, 0.8–1.5 cm. thick; stem 6–15 dm. tall, rather slender, usually divaricately branched above, glabrous except for the spreading somewhat gland-tipped hairs in upper parts: leaves well distributed, 5–7-parted nearly or quite to base, with cuneate-rhombic principal divisions which tend to be 3-lobed near the middle, then pinnately lobed, blades mostly 5–10 cm. wide, subcordate at base, acute to acuminate at tips, cauline leaves with shorter petioles than blades, lowermost long-petioled, lower leaves of inflorescence gradually reduced, uppermost becoming linear-bracteate: racemes few-flowered, in an open panicle which is 1–5 or more dm. high; pedicels divaricate, often arcuate and exceeding flowers; flowers violet, somewhat pilose, 3–4 cm. high; helmet gaping, about 2 (2.5) cm. high, broadly rounded and somewhat arched forward above, sinuate above the porrect beak (about 5 mm. long), very concave on the lower margin which is 12–15 mm. long, narrow at base; lateral sepals reniform-obovate, 12–15 mm. long; lower sepals 10–12 mm. long, unequal in width; claw of petal somewhat curved, the spur capitate and curved upward, blade 6–7 mm. long; stamens glabrous: carpels glabrous, becoming as much as 3 cm. long in fruit; seeds as in *A. variegatum*.

Aconitum paniculatum extends from Spain to the Balkans; it is exceedingly variable as to leaf-segments, helmet, pubescence, and beak, and has many named botanical forms. It is not listed in the trade as such, but being one of the commonest and widespread European species, of which botanical specimens are distributed under *A. Cammarum*, *A. cernuum*, *A. paniculatum*, it is to be expected under such a name as *A. Cammarum* which is in the trade.

Aconitum hebegynum DC. differs from *A. paniculatum* by a strongly arched helmet, twice as tall as wide. It is native of Switzerland and the Carpathians.

13. **Aconitum variegatum** Linn. Sp. Pl. 532 (1753). Fig. 258.

Tubers 1–3 cm. long, 0.8–1.5 cm. thick; stem 1–1.5 m. tall, slender, flexuous and usually freely branched above, quite glabrous: leaves 5–7-fid, with cuneate-rhombic parts which are subpinnately lobed and then with few large lanceolate to ovate-acute to acuminate teeth, the blades mostly 5–12 cm. wide, more or less cordate at base, well distributed, gradually reduced up the stem and passing into the lower leafy bracts of the inflorescence: inflorescence usually open-paniculate, with divaricate slender branches and few-flowered rather lax racemes; lower pedicels elongate, exceeding the flowers; uppermost bracts short, simple, lance-elliptic; flowers 3.5–4.5 cm. or more high, violet; helmet gaping, bent forward, rounded and inflated above, sinuate in front above the straight or somewhat bent

258. ACONITUM VARIEGATUM. Helmet strongly arched; leaf-lobes rather wide.

beak, 23–30 (40) mm. high, 12–22 (25) mm. long on the curving lower margin, strongly narrowed at base; lateral sepals reniform-obovate, 12–20 mm. long; lower sepals 10–17 mm. long, very unequal in width, 1–3 and 4–6 mm.; claws of petals rather straight, the spurs capitate-recurved; blades expanded, about 1 cm. long; filaments glabrous, dilated in lower half: carpels 3–5, glabrous, up to 30 mm. long in fruit; seeds 3-angled, with many horizontal transparent plates.

The typical form (subsp. *variegatum* Gáyer) occurs in the eastern Alps and Carpathians. It varies greatly and has a number of described varieties and forms based on leaf-lobes, pubescence, variegated flowers, and the like. The names *variegatum*, *variegatum pallidiflorum*, and *rostratum cæruleum* appear in the trade. *A. variegatum* var. *pallidiflorum* Séringe (Mus. Helv. i, 140, 1823) has the flowers pale or variegated. *A. rostratum* can be distinguished by the following key to European aconites near *A. variegatum:*

A. Inflorescence lax, with spreading branches.
  B. Helmet bent forward, gaping, with broadly rounded apex and conspicuously sinuate front, helmet long-attenuate toward base. Eastern Alps and Carpathians.....*A. variegatum* Linn.
  BB. Helmet erect, closed, with narrowly rounded apex and not much sinuate in front, merely narrowed toward base. Saxony to Carpathians.....*A. gracile* Reichb.
AA. Inflorescence strict, with short erect branches.
  B. Lobes of leaves sublinear: helmet curved forward, sinuate in front. Western Switzerland.....*A. rostratum* Bernh. in DC.
  BB. Lobes of leaves lanceolate: helmet erect, scracely sinuate. Eastern Alps to Balkans.....*A. balcanicum* Vel. (*A. judenbergense*)

14. **Aconitum bicolor** Schultes, Obs. Bot. 101 (1809). Figs. 259, 260.

A. Napellus var. *bicolor* Séringe, Mus. Helv. i, 158 (1823).

A. vulgare var. *bicolor* DC. Syst. Nat. i, 372 (1818).

A. Cammarum Linn. Sp. Pl. Ed. 2, 751 (1762), in small part.

A. Stoerkianum Reichb. in Flora, i, 202 (1818); Illust. Acon. pl. 71 (1823–27).

A. intermedium DC. Syst. Nat. i, 374 (1818).

A. versicolor Schleich. Cat. 5 (1821).

A. intermedium var. *versicolor* Séringe, Mus. Helv. i, 152 (1823).

A. intermedium var. *glabrum* Séringe, l. c.

A. Napellus × *A. variegatum ?* Richter-Gürke, Pl. Eur. pl. 2, p. 444 (1897–1903).

Plant about 1 m. tall, glabrous practically throughout, with short ascending branches in the pyramidal inflorescence: leaves mostly 5–8 (10) cm. wide, 5–7-fid, primary segments cuneate at base, rhombic in outline, often 3-lobed near middle, then with few large lanceolate lobules or teeth 3–5 mm. wide; leaves gradually reduced in lower part of inflorescence, the uppermost linear: lateral racemes ascending, few-flowered, central raceme

259. Aconitum bicolor. Root system with tubers.

260. ACONITUM BICOLOR. Helmet of the Napellus type; leaves of the variegatum-paniculatum type.

lax, up to 2 dm. long, lower pedicels elongate, ascending; flowers mostly 3.5–4 cm. high, frequently white with purple margins, glabrous without; helmet strongly arched forward, 22–26 mm. high, sinuate above the short beak, strongly arcuate and 14–18 mm. long on the lower margin; lateral sepals rounded-ovate, 15–18 mm. long; lower sepals unequal in width, 12–15 mm. long; claw of petal somewhat curved, spur capitate, curved upward, blade 5–6 mm. long; filaments pilose above the expanded lower part: carpels 3–5, glabrous, not maturing fruitful seeds.

Aconitum bicolor is supposed to be a hybrid between some form of *A. Napellus* and *A. variegatum*, having leaves like the former and flowers near the latter. It is said always to be sterile. Schafer and La Cour (Ann. Bot. xlviii, 700, 1934) in a study of the cytology of the plant say "that the cytological results fully bear out this possibility" of hybridity. Gáyer (Magyar Bot. Lapok, viii, 192, 1909) writes that it seems to have originated in the Alps and gotten into the gardens of Europe, where it is widespread, from peasant gardens of the Alps. It seems to have been cultivated for a very long time, sometimes apparently escaping and maintaining itself. In American trade it goes by the names *A. Napellus*, *A. Napellus bicolor*, *A. Stoerkianum*, and *A. Cammarum*.

There is some question as to the proper name to be applied to this plant. That best established in the literature, *A. Stoerkianum* Reichb., goes back to 1818, as does *A. intermedium* DC. Some writers think it should be called *A. Cammarum* Linn. which at least in small part seems to have applied here. Gáyer (Magyar Bot. Lapok, viii, 132–140, 1909) admits that Linnæus probably had this plant in mind when he proposed the name *Cammarum*, but his references to earlier writers and the countries cited for distribution seem largely to refer to other entities such as *tauricum*, *neomontanum*, and *judenbergense*. Moreover, there is no specimen in the Linnæan herbarium labelled *Cammarum*. I, therefore, follow such European writers as Gáyer and Hayek in not using the Linnæan name. The next available name cited by Gáyer (page 192) and, so far as I can judge, correctly so, is *A. bicolor* 1809 rather than *Stoerkianum* or *intermedium*, both 1818.

Other supposed hybrids, the names of which are sometimes met in the trade, are:

Aconitum acutum Reichb. Mon. Acon. 93, pl. 14, fig. 2, 1820 (possibly *tauricum* x *judenbergense*). Up to 5 dm. high, glabrous above: inflorescence a simple raceme; flowers glabrous, violet; helmet erect, closed, conical-arched, 18–20 mm. high, almost straight on basal line; filaments glabrous.

Aconitum acuminatum Reichb. Illust. Acon. pl. 68, 1823–1827. Treated by Gáyer (Magyar Bot. Lapok, viii, 196, 1909) as a form under *A. molle* Reichb. and supposed to be a hybrid between *A. compactum* and *A. paniculatum*: 1 m. or more tall, spreading-villous above: inflorescence pyramidal; helmet conic-hemispheric, 20–28 mm. high, violet, basal line much curved.

Aconitum exaltatum Bernh. in Reichb. Illust. Acon. pl. 72, 1823–1827 (*A. firmum* x *A. gracile?*). Stem very tall, higher than a man: inflorescence glabrous, narrower and longer than in *A. bicolor;* flowers pale lilac; helmet narrower above, gaping; filaments pilose.

15. **Aconitum Carmichaelii** Debx. in Act. Soc. Linn. Bord. xxxiii, 87 (1879). Figs. 261, 262.

A. Fischeri Forbes & Hemsl. in Journ. Linn. Soc. Bot. xxiii, 20 (1886), not Reichb. *A. Fischeri* of Hort.

A. Bodinieri Lévl. & Vaniot, in Bull. Acad. Geogr. Bot. xi, 45 (1902).

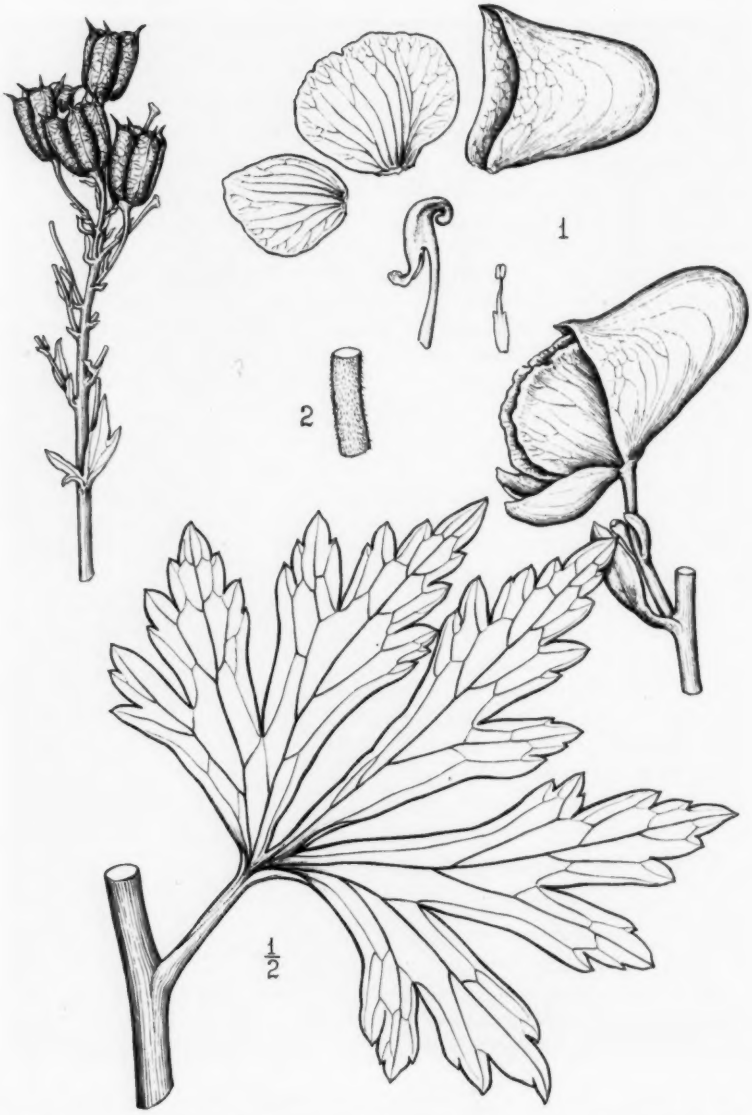
A. Kusnezoffii Reichb. var. *Bodinieri* Fin. & Gagnep. in Bull. Soc. Bot. France, li, 508 (1904).

A. Wilsonii Stapf ex Veitch, in Journ. Roy. Hort. Soc. xxviii, 58 (1903), *nomen nudum;* Stapf ex Mottet, in Rev. Hort. lxxxii, 222, fig. 88 (1910).

A. Fischeri var. *Wilsonii* Davis in Bailey, Stand. Cyclo. Hort. 210 (1914).

Sturdy erect plant, few-stemmed, 4–20 (25) dm. tall; tuber commonly 3–5 cm. long; stem 0.5–1 cm. or more thick at base, glabrous until crisp-pubescent in upper parts, rather densely and uniformly leafy: leaves coriaceous, dark green and subglabrous or somewhat strigulose especially on veins of upper surface, lighter green and same as to pubescence beneath; blades more or less rounded in outline, not cordate at base, 5–15 cm. wide, 3-cleft to within 3–10 mm. of base, the central division not petiolulate, cuneate-rhombic in outline, usually somewhat 3-lobed near the middle and with few large acute to obtuse teeth on each lobe; lateral divisions bilobed to within one-third to one-half the distance from the base, then somewhat lobed or coarsely toothed or both; lower petioles exceeding blades, main cauline ones usually shorter, both gradually somewhat reduced to just below the inflorescence: inflorescence typically a very dense virgate panicle, the branches almost erect, usually short and few-flowered, developing after the central raceme among the upper leaves, sometimes longer or sometimes quite lacking especially in wild plants; central raceme few- to many-flowered, compact, 3–20 cm. long, whole inflorescence densely crisp-pubescent; pedicels mostly suberect and 1.2–4 cm. long; bracts of upper inflorescence linear, lower leafy and 3-partite; flowers deep blue-purple without, somewhat whitish within, commonly 3–4 cm. high; helmet broad and rounded above, 20–28 mm. high, 13–15 mm. wide, 17–22 mm. long on the lower almost straight subhorizontal to ascending lower margin, almost straight on front margin, not much beaked, sparsely pubescent; lateral sepals 15–20 mm. long, about as wide or wider, somewhat pubescent without, pilose within especially toward the margin; lower sepals elliptical, 14–16 mm. long, 7–14 mm. wide, somewhat pubescent without, slightly pilose within; claw of petals almost straight, spur slender, curved to coiled, blade saccate, somewhat curved, about 6 mm. long; filaments glabrous, toothed on each side above the hyaline dilated lower half, slender and dark

261. Aconitum Carmichaelii. Photograph of the garden plant called "A. Fischeri."



262. ACONITUM CARMICHAELII. Drawings made from the same plant as shown in Fig. 261.

above, anthers dark: carpels mostly 3, sometimes 5, mostly somewhat crisp-pubescent, rarely glabrous, 12–15 (20) mm. long in fruit, the divergent styles 2.5–4 mm. long; seed about 3 mm. long, with numerous hyaline plates.

Native through all central China, from Kansu and Shantung to Kiangsi and Yunnan. In horticulture and in botanical literature it has been confused with *A. chinense* Paxt. (an east Chinese species with spreading pubescence), *A. Fischeri* Reichb. (a Siberian plant with thinner less deeply lobed cordate leaves and glabrous carpels), *A. Kusnezoffii* Reichb. (of northern China, Korea to eastern Siberia, and with glabrous pedicels, thinner leaves, and more concave lower margin to the helmet), and with *A. autumnale* Lindl. (see *A. Henryi* for discussion).

Of garden plants the flowers are most like those of *A. Henryi*, but the stiffer compact habit, more coriaceous denser foliage, and much later flowering season (late September to October at Ithaca, New York) readily separate the species. In the garden are two of the commonest strains: (1) The one known in the trade as *A. Fischeri* (sometimes catalogued as *A. autumnale*), growing 2½–4 feet tall, with compact inflorescence commonly 4–6 inches long, first introduced into England by Mr. Fortune in 1846 from Chusan; (2) *A. Wilsonii*, growing up to 6 or 8 feet, with a more open inflorescence commonly 10–18 inches long, first introduced in England by Messrs. J. Veitch in 1903 and exhibited in the Royal Horticultural Society meeting October 18, 1904. A form known as Barkers variety, from Mr. E. J. Barker of Ipswich, was given an award by the Royal Horticultural Society in 1934; it is said to be "very superior."

I am not disturbed by the report of different chromosome counts for *A. Fischeri* (32 by Sakai, Trans. Sapporo Nat. Hist. Soc. xiii, 74–77, 1933) and *A. Wilsonii* (64 by Schafer & LaCour, Ann. Bot. xlviii, 693–713, 1934). I have seen Japanese specimens labelled *A. Fischeri* which are not the plant here under consideration, nor the Siberian plant; there is no knowing exactly what Sakai's plant was.

16. **Aconitum Fischeri** Reichb. Illust. Acon. pl. 22 (1823–27). Fig. 263.

A. arcuatum Maxim., Prim. Fl. Amur. 27 (1859).

A. Fischeri var. *arcuatum* Regel, in Bull. Soc. Imp. Nat. Mosc. xxxiv, 99 (1861).

Plants apparently 1 m. or so high; stem erect, mostly glabrous and simple below, somewhat strigulose and with ascending arcuate or spreading to deflexed slender branches in the inflorescence, leafy: leaves rather uniformly distributed, fairly thin, mostly glabrous except for some crisp puberulence on veins of under surface, mostly 5–15 cm. wide, roundish in outline, cordate at base, rather equally 5-parted to within 5–20 mm. from base, the divisions tending to be 3-lobed above middle and then sharply, coarsely and even sublaciniately toothed, often acuminate at apex; lowest

petioles exceeding blades, cauline ones reduced; lowest leaves in inflorescence reduced, sometimes 3-parted, passing into linear bracts: inflorescence from compact to very open, rather sparingly crisp-puberulent; pedicels up to several cm. long, often arcuate and quite glabrous; flowers few to several on each branch, not crowded, mostly violet-purple, 3.5–4 cm. high; helmet 19–23 mm. high, 12–16 mm. wide, 17–20 mm. long on the lower slightly concave margin, strongly arched above, with sinuous profile and spreading rather pointed beak about 5 mm. long, quite glabrous without; lateral sepals reniform-obovate, 13–15 mm. long, almost as wide, subglabrous except for a sparse pilosity within near margin; lower sepals 12–15 mm. long, unequal in width, the one 2–4, the other 5–7 mm. wide, slightly pubescent without toward tips, scattered-pilose within; stamens glabrous, not toothed above the dilated base: carpels 3, glabrous, 15–17 mm. long in fruit.

Manchuria to Kamtchatka. While the name *Fischeri* is widely used in cultivation, it of course applies to *A. Carmichaelii;* true *A. Fischeri* is more like forms of the western American *A. columbianum* but differs from all such by its crisped not spreading pubescence in the inflorescence and by its broader helmet with a less concave lower margin.

263. ACONITUM FISCHERI. Drawings made from a Siberian plant.

Aconitum arcuatum Maxim. seems to be a form, more flexuous and semi-scandent, perhaps more glabrous in the inflorescence, but with the same morphology as *A. Fischeri;* perhaps it should be kept as of varietal rank.

17. **Aconitum chinense** Paxt. Mag. of Bot. v, 3, pl. 3 (1838); W. J. Hooker, in Bot. Mag. lxviii, t. 3852 (1841).

A. sinense Sieb. ex Lindl. & Paxt. in Fl. Gard. i, 17 (1851).

A. Fortunei Hemsl. in Journ. Linn. Soc. Bot. xxiii, 20 (1886).

A. Fauriei Lévl. & Vaniot, in Bull. Soc. Agr. Arts Sarthe, lx, 77 (1905).

Suggesting *A. Carmichaelii* in robust habit, coriaceous foliage, straight base of helmet but pedicels provided with numerous spreading gland-tipped hairs; flowers smaller, helmet 15–20 mm. high, lateral sepals 13–15 mm. long, lower sepals 13–14 mm. long, spurs of petals small, reflexed, not coiled; carpels glabrous.

Confined to eastern and northeastern China; cultivated in Japan. I have seen no American cultivated plants although the names *sinense* and *Fortunei* are occasionally listed in catalogues. According to the Gardeners' Chronicle (ser. 3, vi, 440, 1889) the plant was introduced into England in 1833 by Dr. von Siebold and flowered by Messrs. Young at the Epsom Nursery, September 1837. The garden form was distributed from the Leyden Herbarium as *A. sinense* Sieb. & Zucc.

18. **Aconitum columbianum** Nutt. in Torr. & Gray, Fl. N. Amer. i, 34 (1838). Fig. 264.

Tuber 1–3 cm. long, up to 1 cm. thick; stems mostly erect and stout, sometimes weak and reclining or climbing, 5–20 dm. tall, glabrous below, spreading-pubescent and even somewhat viscid in the inflorescence: leaves, thin, 5–12 (15) cm. broad, deeply 3–5-cleft, the primary divisions rhombic cuneate at base, then laciniately toothed or cleft: inflorescence racemose to paniculate, rather lax, pilose, the lower bracts foliose and tripartite, the upper linear; lower pedicels elongate, arcuate; flowers purple or blue, villous, 3–4 cm. high; hood 18–25 mm. high, conic-rounded above, not much sinuate above the usually descending beak, 15–18 mm. long on the curved lower margin; lateral sepals reniform-obovate, 13–17 mm. long; lower sepals unequal in width, 11–14 mm. long; claws somewhat curved, the spur recurved-capitate, the blade expanded, 7–8 mm. long; filaments usually glabrous: carpels 3, usually somewhat pubescent, 12–18 mm. long in fruit; seeds lamellate, 3–4 mm. long.

British Columbia to California, Montana, New Mexico. Exceedingly variable in every way. Listed in the trade, but no cultivated specimens seen. Also occasionally listed are: *A. Bakeri* Greene (Pl. Baker. iii, 5, 1901), 4–6 dm. high, leaves about 6 cm. wide, spikes dark blue, helmet strongly sinuate above the almost horizontal beak, a Rocky Mountain plant; *A. lutescens* A. Nels. (Bot. Gaz. xlii, 51, 1906), with ochroleucous flowers,

264. ACONITUM COLUMBIANUM. Upper center, seed with transverse lamellæ of paniculatum—variegatum group.

otherwise like *A. Bakeri; A. Howellii* A. Nels. & Macbr. (Bot. Gaz. lvi, 473, 1913), very near to *A. columbianum* but weak-stemmed, bulbiferous in upper leaf-axils, helmet with narrow horizontal beak 6–7 mm. long, Oregon, name occasional in the trade.

19. **Aconitum uncinatum** Linn. Sp. Pl. Ed. 2, i, 750 (1762). Fig. 265.

Tubers 1–5 cm. long, up to 1 cm. thick; stem slender, weak, ascending or climbing, 6–12 dm. high, glabrous, leafy: leaves reniform-orbicular in outline, 4–8 (10) cm. wide, 3–(5–)fid almost to base, the primary central division oblong-rhombic, more or less pinnately coarsely toothed in upper half with blunt broad teeth, lateral primary divisions often 2-lobed, then much like central one; petioles mostly short; leaves only gradually reduced upward in lower inflorescence, bracteate at very summit: flowers few in short terminal and lateral racemes, deep blue, about 3 cm. high; pedicels spreading-pubescent, mostly shorter than flowers; helmet about 2 cm. high, rounded-conic above, not sinuous above the somewhat acute but scarcely beaked apex, 17–20 mm. long on the lower somewhat curved margin; lateral sepals reniform-obovate, 13–15 mm. long; basal sepals 12–13 mm.

265. ACONITUM UNCINATUM var. ACUTIDENS. The cuneate rather sharply pointed leaf-lobes characterize the variety.

long; claws rather straight, spur hooked, blade expanded, about 5 mm. long; filaments glabrous: carpels 3, glabrous, 12–14 mm. long in fruit.

The typical less common form of the species (illustrated in Bot. Mag. t. 1119, 1808) occurs at relatively low altitudes, Virginia to South Carolina. The more common plant, var. **acutidens** Fernald (Rhodora, xliv, 398, 1942), with leaf-divisions more definitely cuneate and teeth more pointed, is at somewhat higher altitudes, Maryland to North Carolina and Tennessee. The variety is apparently the plant more commonly met in cultivation, judging from the few garden specimens I have seen.

20. **Aconitum ferox** Wall. ex Séringe, Mus. Helv. i, 160 (1823).

Tuber 2.5–4 cm. long, 1–1.5 cm. thick; stem erect, 4–9 dm. high, yellow-pilose above: leaves scattered, 8–20 cm. wide, 5-partite to near the base,

266. Aconitum delphinifolium. Upper middle, large flower of var. sibiricum.

divisions cuneate at base, 3-lobed near the middle, then pinnate-laciniate or -dentate, the ultimate lobules subacuminate, peculiarly divergent: flowers blue, hairy, about 3.5 cm. high, in a loose raceme; helmet 20–24 mm. high, semi-orbicular in outline, ending in a descending beak, 17–20 mm. long on the curved lower margin; claw scarcely curved, spur very short, subhorizontal, blade short; filaments glabrous: carpels 5, pubescent.

Nepal, India. Name occasional in the trade, but have seen no cultivated specimens to check their identification.

21. **Aconitum heterophyllum** Wall. ex Royle, Illust. Himal. 56, pl. 13 (1834).

A. ovatum Lindl. in Bot. Reg. xxvi, misc. 53 (1840).

Tuber 2–5 cm. long, 0.5–1.2 cm. thick; stem erect, simple or branched, 1.5–10 (15) dm. high, crisp-pubescent in upper parts: lowest leaves cordate, 5-lobed to about middle; upper ones sessile or nearly so, ovate-cordate, 3.5–12 cm. long, incised-crenate; pedicels erect, bracteoles dentate: flowers blue to violet with dark veins; helmet 18–20 mm. high, boat-shaped: follicles 16–18 mm. long, appressed-pubescent.

Himalayan Mountains. Occasional in cultivation, mostly in botanical gardens.

Aconitum cordatum Royle (Illust. Himal. 56, 1834), another name occasional in the trade, is near *A. heterophyllum*, but with inflorescence finely villous; bracteoles narrow, subentire; flowers green, veined with purple; carpels with spreading hairs.

22. **Aconitum delphinifolium** DC. Syst. Nat. i, 380 (1818). Fig. 266.

A. delphinifolium var. *americanum* DC. l. c.; Reichb. Mon. Acon. 79, pl. 9 and 1, 2, 3 (1820).

A. delphinifolium var. *kamtschaticum* DC. l. c.

A. Napellus var. *delphinifolium* Séringe, Mus. Helv. i, 159 (1823).

A. Chamissonianum Reichb. Mon. Acon. pl. 10, f. (1820).

A. obscurum Reichb. ex Schlecht. in Linnaea, vi, 582 (1831).

A. tenue Rydb. in Bull. Torr. Bot. Club, xxix, 149 (1902).

A. semigaleatum Pall. ex Reichb. Uebers. Acon. 38 (1819); Schlecht. in Linnaea, vi, 582 (1831).

A. Napellus var. *semigaleatum* Séringe, Mus. Helv. i, 155 (1823).

Tuber 1–1.5 cm. long, up to 5 mm. thick; stem slender, erect, 1–5 (10) dm. high, few-leaved, more or less crisp-puberulent especially above: leaves 2–8 (12) cm. wide, cordate at base, mostly 5–7-fid, the divisions lobed then laciniate into lance-linear lobes 1–5 mm. wide, subglabrous, mostly rather long-petioled: flowers deep blue, loose-pubescent, 2.5–3.5 cm. high, 1-several in loose raceme or racemes, with much elongate lower

pedicels; helmet convex-hemispheric, 1.5–2 cm. high, slanting in front to a descending inconspicuous beak, 1.5–2 cm. long on the concave lower margin; lateral sepals orbicular-obovate, 12–16 mm. long; lower sepals lance-elliptic, 12–15 mm. long; claw curved only near apex, spur bent upward, cut off short, blade wide, 3–4 mm. long; stamens glabrous: carpels 3, glabrous to strigose, up to 1.5 cm. long in fruit.

Alaska to British Columbia and Dakota. Plants from Siberia and Unalaska tend to have larger flowers (4 cm. high) with broader more rounded helmet (2.5–2.8 cm. long) and are the var. **sibiricum** DC. (Syst. Nat. i, 380, 1818).

The name *A. delphinifolium* is in the trade, although I have seen no actual specimens from gardens. The plant is easily recognizable by its low stature, few rather finely divided leaves, and few flowers with broadly rounded almost boat-shaped helmet.

23. **Aconitum Henryi** Pritzel, in Bot. Jahrb. xxix, 329 (1900), as amended by Handel-Mazetti, in Act. Hort. Gotoburg, xiii, 129 (1939). Figs. 267, 268.

Probably *A. autumnale* Lindl. in Journ. Roy. Hort. Soc. ii, 77 (1847), not Reichb. 1827.

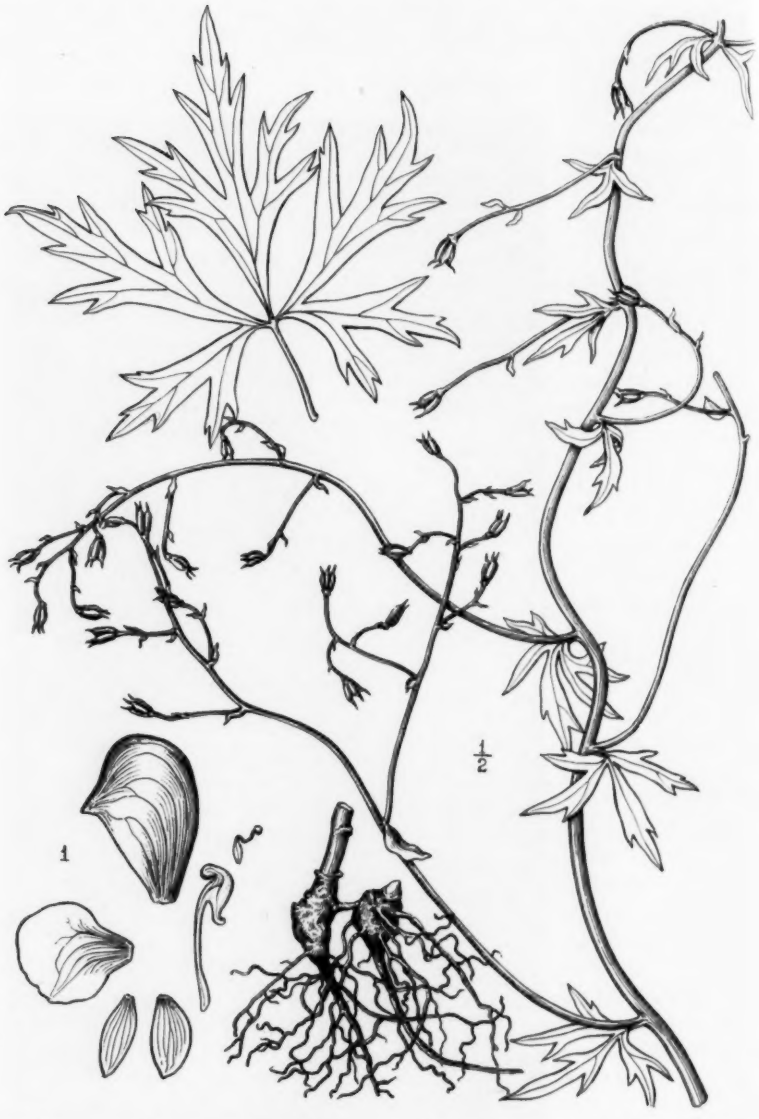
Plant 1–2 m. high, the tuber ellipsoid, 1–3 cm. long; stem erect and stout in lower part, sinuous above, green to red, branching freely and openly above, the branches slender, spreading to ascending, flexuous to twining, with rather short few-flowered racemes; lower stem strigulose to glabrous, central stem mostly glabrous; inflorescence more or less generally strigulose, or with the crisped hairs confined only to the pedicels or just their upper parts: leaves well distributed, fairly heavy in texture, deep green and almost glabrous to somewhat strigulose above, lighter and similar in pubescence beneath, mostly 5–15 cm. wide, usually on shorter petioles, rounded-obovate in outline, 3–5-fid nearly or quite to the base, the central division petiolulate especially in lower leaves, somewhat cuneate, usually 3-lobed or pinnately lobed at middle and above, then deeply and coarsely few-toothed; lateral divisions at once 2-parted, each part then lobed and toothed much as in the central one; uppermost leaves gradually reduced, shorter-petioled and tending to be somewhat less completely divided at base: inflorescence a very open panicle, forming a considerable portion of upper part of plant, the individual racemes with few to several flowers, and often grouped on larger branches; lower bracts foliose, tripartite, uppermost simple and linear; pedicels slender, 1–4 cm. long, ascending, spreading or so curved as to bring the flowers into vertical position; flowers mostly deep bluish-purple, 2–3.5 cm. high; helmet 16–22 mm. high, convex-rounded on top, somewhat pubescent, almost straight in front, the lower margin ascending, slightly concave, 14–20 mm. long, ending in an inconspicuous broad beak 1–2 mm. long which points down; lateral sepals almost round, 12–18 mm. long, almost glabrous to slightly pubescent without, somewhat pilose within; lower sepals lance-elliptic, 10–12 mm. long, 2.5–4 mm. wide, more or less pilose especially on inner surface; claw of petal somewhat

curved, spur rounded, recurved but not coiled, blade saccate, 2-lobed, the free part 3–4 mm. long; filaments nearly or quite glabrous, hyaline, dilated in lower half, with or without a tooth where narrowed into the purplish upper terete portion, anthers purplish: carpels 3–5, more or less pubescent.

China: Hupeh, Szechuan, Kansu.

As treated by Handel-Mazetti the species varies considerably in width and division of leaf-lobes, in the amount of coalescence at base of leaf-blade, in climbing tendency, in shape of helmet, and the like. *Rock 14615* cited by him, shows a long basal stem portion about 1 cm. thick and flexuous only in upper parts, while a very good match *14860* is more slender and a climber. Most other available Chinese specimens show only the upper twining parts of the plants. Garden specimens labelled (1) "autumnale," (2) "Napellus," (3) "californicum," and (4) "Sparks variety" seem largely to be this species, or derived

267. ACONITUM HENRYI. Photograph of a garden specimen.



268. ACONITUM HENRYI. Lower middle, tubers showing method of development; note sinuous semi-scandent axis of inflorescence.

in large part from it, and in some cases are matched very well by wild specimens.

(1) *Aconitum autumnale* Lindl. would be the earliest name, but it is not available since this binomial was used in 1827 by Reichenbach for another plant. Lindley gives his plant as having flowers "lilac and white" which might throw it out, and also emphasizes the tooth on each side of the filament. I do find such a tooth in some of the Chinese specimens, although filaments from the same flower may show teeth on both sides, on one side only, on neither side. I have seen no teeth in cultivated plants. I have not seen authentic material of Lindley's species which was founded on garden material from Ningpo in northern China (Fortune in 1846). I can only surmise that it belongs here; it may be *A. Carmichaelii*, which see.

(2) *Aconitum Napellus:* some garden plants under this name definitely belong to *A. Henryi*.

(3) *Aconitum californicum* Hort. Garden plants seen under this name are the same as the above. I do not know the history of the name but find records of it as far back as the Gardeners' Chronicle of 1889 (vol. vi, p. 440) and the Botanical Magazine of 1890 (t. 7130) where J. D. Hooker wrote that he received plants in 1886 under this name from Max Leichtlin.

(4) *Sparks* variety or *Napellus Sparks* variety or *Napellus* var. *Sparksii*, as it exists in American trade, is the same as *californicum*. Schafer and LaCour (Ann. Bot. xlviii, 712, 1934) say that it was "introduced by Messrs. Maurice Pritchard *circa* 1898, being obtained from a cottage garden in Hampshire and named after a gardener called Sparks in Messrs. Pritchard's employment."

I have seen no garden plants maturing seeds, possibly because of the absence of proper insects for pollination, although the large percentage of malformed pollen in such plants suggests possible hybridity. Langlet (Svensk. Bot. Tidskr. xxi, 1–17, 1927) reports them as triploid, but Schafer and LaCour (Ann. Bot. xlviii, 693–713, 1934) question the accuracy of determination of Langlet's specimens; they also accept possible hybridity.

Aconitum Henryi has leaves and flowers much like those of *A. Carmichaelii* (*Fischeri* and *Wilsonii* of gardens) but is much more open in habit, with more slender flexuous or twining branches, less coriaceous leaves, and earlier time of flowering. At Ithaca, New York, it blooms in July and August as against late September and October for *A. Carmichaelii*. (Garden plants seem consistently to have 3 carpels, wild ones mostly 5, sometimes 7, although 3 in *Henry 6979* from Hupeh.)

24. **Aconitum japonicum** Thunb. Fl. Jap. 231 (1784); Reichb. Illust. Acon. pl. 36, f. 1 (1823–27). Fig. 269.

A. subcuneatum Nakai, in Bot. Mag. Tokyo, xxviii, 59 (1914) and xxxi, 220 (1917).

Tuber to 5 or 6 cm. long; stem robust, 6–18 dm. high, somewhat angled, rather glabrous except for the crisped pubescence in the upper parts, somewhat flexuous above, densely and rather uniformly leafy throughout; leaves coriaceous, apparently deep green, round in general outline, not cordate at base, subglabrous or with some adpressed hairs on veins especially of lower surface, the blades 5–15 cm. wide, the lowermost on long petioles, the cauline on shorter petioles, 3–5-parted to one-quarter or one-half way from base, if 3-parted the lateral divisions soon bilobed, the

269. ACONITUM JAPONICUM. Note shallow lobing of leaves.

5 divisions mostly with rather few and not very deep broad somewhat mucronate teeth in the upper part: flowers few to many in a terminal or in terminal and upper axillary racemes which may be flexuous and spreading, bluish-purple, about 3.5 cm. high; pedicels densely white-ciliolate, 1–3 cm. long; helmet 20–25 mm. high, 11–13 mm. wide, 18–20 mm. long on lower slightly concave margin, almost glabrous, slightly beaked; lateral sepals 15–17 mm. long, largely glabrous without, somewhat pilose within; lower sepals elliptical, 12–13 mm. long, 5–7 mm. wide; spur of petals somewhat coiled, blade 2-lobed; stamens pilose: carpels 3, almost glabrous, about 2 cm. long in fruit.

Japan: Jesso (Yeso) and northern Hondo.

The above interpretation of the species is based on the statement by Handel-Mazetti (Act. Hort. Gotoburg, xiii, 118–120, 1939) who studied the Thunberg specimen and compared it with Reichenbach's illustration. While the type is meager and partly eaten by insects, Handel-Mazetti is convinced that it has nothing to do with *A. Lycoctonum*, to relationship with which many writers have referred *A. japonicum*. The species suggests *A. Carmichaelii* of China in the coriaceous leaves and crisp puberulence, but has the leaves much less divided, the upper part of the stem more flexuous, the helmet narrower, the filaments pilose, and the carpels more glabrous. I have seen no garden material fitting this concept. Apparently *A. uncinatum* of Japanese references applies at least in part to this, true *uncinatum* of course being a species of the eastern United States.

25. **Aconitum Vilmorinianum** Komar. in Fedde, Repert. vii, 145 (1909). Fig. 270.

A. Mairei Lévl. in Fedde. Repert. xiii, 341 (1914).

Tuber 5–6 cm. long, 1–1.5 cm. thick; stem slender, climbing, branched, up to 3 m. tall, densely crisp-pubescent in upper parts: cauline leaves trifid nearly or quite to base, the central division broad-rhombic, 3–4 cm. long, cuneate at base, then trilobed with broad coarsely few-toothed lobes, the lateral divisions soon 2-lobed, then somewhat like the central one; petioles mostly shorter than blades: racemes lateral and terminal, very flexuous, lax, with linear bracts; pedicels up to 5 cm. long; flowers 3.5–4 cm. high, dark purplish-blue, pubescent without; helmet rounded above, about 25 mm. high, slightly sinuous above the short deflexed beak, 1.5–2 cm. along the curved lower margin; lateral sepals almost round, about 15 mm. long; lower sepals 13–14 mm. long, about 5 mm. wide; claw about 15 mm. long, not much curved, spur circinate-recurved, blade broad, about 7 mm. long; stamens glabrous: carpels mostly 5, glabrous.

Yunnan, China. First introduced by Vilmorin-Andrieux of Paris about 1908 as *A. volubile latisectum*, but the latter was originally described from Vladivostock, and is a different plant.

270. Aconitum volubile, to left and above. Aconitum Vilmorinianum, lower right, with flower and leaf.

26. **Aconitum volubile** Pall. in Koelle, Spic. Acon. 21 (1786); Willd. Sp. Pl. ii, 1237 (1800). Fig. 270.

A. eriostemum DC. Syst. Nat. i, 377 (1818).

A. ciliare var. *oligotrichum* DC. op. cit. 378.

A. Sczukini Turcz. in Bull. Soc. Nat. Mosc. xiii, 61 (1840).

At first erect and slender, later usually climbing and twining, the upper parts spreading-pilose: leaves trifid, the divisions lobed then laciniate into lance-linear lobules or less deeply dentate: racemes loose, few-flowered; flowers 3–3.5 cm. high, purple and green or blue, pilose; helmet round-conic above, 21–23 mm. high, strongly sinuous above the spreading beak (5–7 mm. long), 13–15 mm. long on the curved lower margin; lateral sepals reniform-obovate, 12–15 mm. long; lower sepals 10–12 mm. long; claw slightly curved, 12–15 mm. long; spur recurved-capitate; blade about 7 mm. long, broad, obcordate; stamens glabrous or nearly so: carpels 3–5, divergent, pilose to glabrous.

Manchuria and eastern Siberia. The name *volubile* is in the trade, also *A. volubile tenuisectum*, a name originally applicable to a Siberian plant and used, possibly correctly, for a Manchurian plant by Vilmorin-Andrieux of Paris about 1910.

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thyraicum: synonym of *moldavicum*, a lavender-flowered relative of *A. Vulparia*.
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